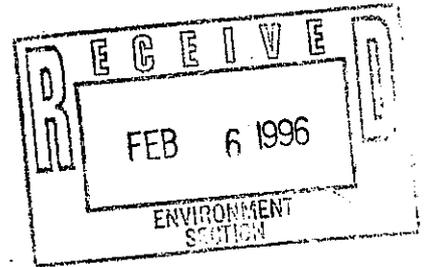


TRANSMITTAL FORM

To: Bureau of Design and Environment  
Attn: Charles Perino  
From: IDOT District 1  
Re: Wetland Mitigation Site Assessment



Route and Location

Route: US 41/IL 137  
County: Lake  
Project Length: NA  
Project Number: P-91-030-90

Survey Conducted By: Allen Plocher (vegetation and hydrology)  
Paul Tessene (vegetation and hydrology)  
Jeff Olson (vegetation and soils)  
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Center for Wildlife Ecology  
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Champaign, Illinois 61820  
(217) 333-6292, 244-7984, 244-6858

Date Conducted: April, June and September 1995

Project Summary:

A detailed site inventory was completed for the proposed US 41/IL 137 Wetland Mitigation Site near North Chicago, Lake Co., Illinois. Information about the site's ecology, recent history, surrounding land use, pre-settlement vegetation, soils, hydrology, plant communities, wildlife use, potential habitat for threatened and endangered species, and site potential for wetland restoration or creation is presented in the attached report. A quantitative vegetation survey was conducted. The Illinois State Geologic Survey has conducted hydrologic investigations at the site and this information, although summarized here, is presented in a separate report.

Signed: Allen E Plocher  
Dr. Allen E. Plocher  
INHS/IDOT Project Coordinator

Date: 2/2/96

Signed: Pat W Brown  
Dr. Pat W. Brown  
INHS/IDOT Project Principal Investigator  
Director, Center for Wildlife Ecology

Date: 2/2/96

**Report:**  
**US 41/IL 137, Excess Parcel, P-91-030-90**  
**North Chicago, Lake Co.**  
**Wetland Mitigation Site Assessment**  
**Quantitative Vegetation Analysis and Community Description**

### **Introduction**

In April, June and September of 1995, field investigations were conducted on a 62.3 ha (154 acre) site at North Chicago, Lake Co., IL (T. 44 N., R. 12 E., Sect. 7, SW/4 NW/4 and NW/4 SW/4, and Sect. 18, NW/4 NW/4). The potential exists for the site to be used as a wetland mitigation bank by the Illinois Department of Transportation (IDOT). The purpose of this report is to describe the plant communities present and map their locations. Recent history of the site, surrounding land use, hydrology and soils, Ecology and potential for threatened and endangered plants and animals are also discussed. An evaluation of the site's potential for wetland creation and mitigation is presented.

### **Methods**

Quantitative vegetation sampling was carried out. Ten parallel transects, with a spacing of 152.4 m (500 ft), were established on a bearing of due East (perpendicular to the long axis of the parcel). Sample points were established at 76.2 m (250 ft) intervals on each transect, for a total of 50 sample points. At each sample point, understory vegetation was tallied as percent cover by species in a 1 m<sup>2</sup> quadrat, and shrub layer vegetation was tallied as number of stems by species within a 25 m<sup>2</sup> circular plot. Since sedge meadow is a community of good natural quality and diversity which covers a relatively small percentage of the site, there was concern that this community would not be adequately sampled. Therefore, within the sedge meadow community, an additional four quadrats were positioned by random toss and sampled. One patch of pin oak (*Quercus palustris*) woodland (uncommon in northern Illinois) occurs on the site and was missed in the sampling due to its small size. Because of the simple nature of this community, dominant species were determined by visual estimation. For understories, importance values (IV) were calculated as (relative frequency (RF) + relative dominance (RDM)) / 2. For shrub layers, importance values were calculated as (relative frequency (RF) + relative density (RD)) / 2. A species list was compiled for each plant community. The lists include all species occurring within sample plots and additional species encountered while traversing the site.

A Floristic Quality Index was calculated for each plant community. This index should not be used as a substitute for quantitative vegetation analysis, but it does provide a measure of floristic integrity. The FQI was calculated as follows:  $I = R/N^{1/2}$ , where R represents the sum of all numerical ratings for species recorded in the area and N represents the number of recorded native species. The mean C was calculated as follows: Mean C = R/N. FQI values of less than ten indicate low natural quality, while sites with values of twenty or greater have at least some evidence of native character and may be considered environmental assets (Taft et al., 1993; Swink and Wilhelm, 1979).

The site was repeatedly traversed in order to map the locations and aerial extent of plant communities on aerial photographs (1 in = 200 ft scale). Acreage was determined using a digital planimeter. Soil cores were examined in numerous wetland and several upland locations in order to characterize soils and compare to the county soil survey.

## Results

### Recent History and Surrounding Land Use

Aerial photography from 1939, 1954 and 1967 was examined to determine recent history of the North Chicago site. It appears that the northern quarter is most disturbed by agriculture, having been cropped through the 1950's. The second quarter from the north was somewhat less disturbed, with a portion cropped, a portion mowed for hay and some parts too wet for agricultural use. The third quarter was partly mowed for hay and partly too wet for use. The southernmost quarter is least disturbed and appears to have never been cropped or mowed although the presence of a hedge or fence row suggests the possibility of livestock grazing. These observations are reinforced by onsite observations since the northern 40% of the site appears much more disturbed than the southern 60%, and the southern quarter contains the highest quality sedge meadows and prairie remnants. The 1967 aerial photograph shows evidence of mowing in the northern half only and scattered shrubs in most sections, indicating that either mowing had recently ceased or was only carried out sporadically. At that point the site was no longer used for crops. The entire site was dominated by herbaceous species, so until 1967, grazing, fire, mowing or a combination of the three was still in effect. However, 1967 marks the beginning of shrub encroachment: onsite investigation shows that the buckthorn / gray dogwood thicket that currently dominates most of the site is about twenty-five years old.

Currently, the site is bordered on the south, east and west by residential, commercial and industrial property. The surrounding land use is predominantly residential / commercial, with some industry. Agricultural activity has been steadily decreasing for the last thirty years.

### Hydrology and Soils

The site slopes from northwest to southeast. Surface and groundwater move southeastward, ponding in depressions. most surface water enters via culverts from west and north of the site and exits via culverts and natural drainages to the east and southeast. A shallow, perched aquifer exists in the northern third of the site but is discontinuous to the south. Wetlands are supported predominantly by surface water with the shallow, perched aquifer making a contribution in the northern part. Surface water inorganic constituents at the site do not exceed General Use Water Quality Standards and organic chemical concentrations are low (Fucciolo and Miller, 1995).

Soils of wetlands at the site were all found to be Montgomery silty clay, poorly drained. Most upland soils were found to be Frankfort silt loam, somewhat poorly drained. A small amount of Beecher silt loam, somewhat poorly drained, was mapped but not verified in the in the southeast portion of the site. Zurich silt loam, well drained, was found at the northeast corner of the property. Soils appeared, for the most part, to occur as mapped in the Lake Co. Soil Survey. However, Frankfort silt loam is more prevalent than indicated in the southern quarter of the tract (Pashke and Alexander, 1970).

### Vegetation and Ecology

Examination of the soil types present at the North Chicago site indicates that, historically, the wetlands supported marsh in areas of permanent standing water and sedge meadow where inundation is more periodic. The uplands supported prairie except for the northeast corner, which was apparently forest (Pashke and Alexander, 1970). As noted above, disturbance (either mowing, fire or grazing) kept the southern 60% of the site in a somewhat natural prairielike state until about thirty years ago. Since that time, the northern

40% of the property has been returning to a more natural condition following the cessation of row crop production and the entire site has experienced a steady increase in dominance by shrub species due to the absence of fire or other disturbance. Currently, 75% of the site supports a dense thicket of gray dogwood (*Cornus racemosa*) and the exotic, buckthorn (*Rhamnus cathartica*). Sedimentation and other hydrologic disturbances have caused a major portion of the marshes to be dominated by cattails (*Typha sp.*) and a few of the sedge meadows to become dominated by reed canary grass (*Phalaris arundinacea*).

Currently, six vegetation types or plant communities occur at the North Chicago site. Forbland / prairie consists of several small patches of prairie, areas of herbaceous vegetation dominated by exotic pasture grasses and weedy native forbs and relatively open areas dominated by herbaceous vegetation with sparse shrub coverage (about ten stems per 25 m<sup>2</sup>). The understories of these areas are dominated by *Poa pratensis*, *Solidago canadensis*, *Potentilla recta* and *Festuca pratensis* with seedlings of *Cornus racemosa*. The sparse shrub layer is dominated by *C. racemosa* and *Rhamnus cathartica*. This community was found to occupy 8.6 acres (Table 1). Wet meadow refers to periodically inundated areas where disturbance has resulted in the elimination of sedge meadow. These are herbaceous communities or herb dominated communities with sparse shrub coverage. The understories are dominated by *Phalaris arundinacea* and *Helianthus grosseserratus*, and *R. cathartica* and *C. racemosa* dominate the shrub layer. About 2.5 acres of wet meadow were identified (Table 2). Sedge meadows are periodically inundated areas that remain relatively undisturbed. They consist of herbaceous communities and herb dominated areas with very sparse shrub coverage (less than five stems per 25 m<sup>2</sup>). The understories are dominated by *Carex stricta* and *Calamagrostis canadensis* with a sparse shrub layer of *C. racemosa*, *R. cathartica* and *Viburnum lentago*. About 12.5 acres of sedge meadow occur on the site (Table 4). Marsh refers to herbaceous communities with nearly permanent inundation. These areas are dominated by *Typha angustifolia*, *Lemna minor*, *T. latifolia* and *Lythrum salicaria*. About 13.2 acres of marsh were mapped (Table 3). Shrubland / forbland is a community with a dense shrub canopy (about one stem per m<sup>2</sup>) and either sparse or dense understory. The majority of this community was historically prairie and has become shrub-dominated with the cessation of disturbance. The understory is dominated by *Solidago rigida*, *Fragaria virginiana*, *Poa pratensis* and *S. canadensis* along with seedlings of *C. racemosa* and *R. cathartica*. *C. racemosa*, *R. cathartica*, *Crataegus flabellata* and *Lonicera tatarica* dominate the shrub layer. Shrubland / forbland covers 112.9 acres of the site (Table 5). Several very small patches of woodland occur. The pin oak woodland is dominated by *Quercus palustris*, *Prunus serotina*, *Populus deltoides* and *Q. macrocarpa*, with a shrub layer and understory of *R. cathartica* (Table 6). Other woodlands are dominated by *P. deltoides* or *Salix sp.*

Although the northern portion of the North Chicago site is very disturbed, the southern 60% retains very good natural character. Extensive sedge meadows are present and they are rather diverse and undisturbed. *Liatris spicata*, a fairly conservative species, occurs and *Veronica scutellata*, threatened in Illinois, is present. The sedge meadow community was found to have a Floristic Quality Index of 21.0, indicating sufficient natural quality to be considered an environmental asset (Append. Table 3). Several small prairie areas remain and these are rather diverse and contain conservative species. A number of prairie species still persist in most areas dominated by exotic pasture grasses and even occur in places under dense buckthorn thickets. The conservative prairie species located are *Anemone cylindrica*, *Bromus ciliatus*, *Eryngium yuccifolium*, *Gentiana puberulenta*, *Liatris aspera*, *L. spicata*, *Parthenium integrifolium*, *Vicia americana*, *Viola pedatifida* and the state endangered *Oenothera perennis* (Taft et al., 1993). Other prairie species present are *Andropogon gerardii*, *Comandra umbellata*, *Liatris pycnostachya*, *Lobelia spicata*, *Monarda fistulosa*, *Pycnanthemum virginianum*, *Ratibida pinnata*, *Rosa carolina*,

*Schizachyrium scoparium*, *Silphium terebinthinaceum*, *Solidago rigida*, *Sorghastrum nutans*, *Spartina pectinata* and *Zizia aurea* (Mohlenbrock, 1986). The forbland/prairie and shrubland/forbland communities were found to have Floristic Quality Indices of 24.2 and 25.0, which indicate sufficient natural quality to be considered environmental assets (Append. Tables 2 and 4) (Swink and Wilhelm, 1979).

#### Potential for Threatened and Endangered Species

The North Chicago site has considerable potential for the occurrence of threatened and endangered plants and animals. The site's large size (62.3 ha (154 acres)) is relatively uncommon in the Chicago area. Two thirds of the site has never been subjected to crop production or development.

##### Plants

Sedge meadows at the site have been found to contain *Veronica scutellata*, threatened in Illinois. Wet areas were found to contain *Ranunculus cymbalaria*, endangered in Illinois. Sedge meadows or wet prairies at the site could harbor or provide habitat for *Beckmania syzigachne* (state endangered), *Calopogon tuberosus* (state threatened) or *Galium labradoricum* (state threatened). Marshes could contain *Rorippa islandica*, (state endangered). Prairies at the site were found to contain *Oenothera perennis* (state endangered) and sites within 1.6 km (one mile) are known to support *Platanthera leucophaea* (state endangered). Prairies on the site and areas restored to prairie could harbor *Carex crawei* (state endangered), *Cyrtopodium calceolus* (state endangered), *C. candidum* (state endangered), *C. reginae* (state endangered), *Sisyrinchium montanum* (state endangered), or *Tomanthera auriculata* (state threatened) (Herkert, 1991).

##### Animals

Marshes at the site could harbor or provide habitat for *Botaurus lentiginosus*, *Ixobrychus exilis*, and *Xanthocephalus xanthocephalus* (endangered in Illinois), and *Galinula chloropsis* and *Podilymbus podiceps* (threatened in Illinois). The site's sedge meadows could harbor or provide habitat for *Sistrurus catenatus* (endangered in Illinois). Since restoration could result in a prairie area of greater than 50 ha, the site could become habitat for *Asio flammeus* and *Ammodramus henslowii* (both endangered in Illinois) (Herkert, 1992).

**Table 1. Forbland/Prairie:** Relative Frequency (RF), Relative Dominance (RDM), Relative Density (RD) and Importance Value (IV) n=7 8.6 acres

Herb Layer			
	RF	RDM	IV
<i>Cornus racemosa</i>	14.1	16.6	15.4
<i>Poa pratensis</i>	9.3	12.1	10.7
<i>Solidago canadensis</i>	7.0	10.0	8.5
<i>Potentilla recta</i>	4.7	9.0	6.9
<i>Festuca pratensis</i>	2.3	10.9	6.6
<i>Solidago rigida</i>	7.0	3.7	5.4
<i>Poa compressa</i>	4.7	5.8	5.3
<i>Helianthus grosseserratus</i>	7.0	2.9	4.9

Shrub Layer			
Density = 35 stems/100 m <sup>2</sup>			
	RF	RD	IV
<i>Cornus racemosa</i>	50.0	55.6	52.8
<i>Rhamnus cathartica</i>	50.0	44.4	47.2

**Table 2. Wet Meadow:** n=3 2.5 acres

Herb Layer			
	RF	RD	IV
<i>Phalaris arundinacea</i>	27.4	58.3	42.8
<i>Helianthus grosseserratus</i>	18.4	20.4	19.4
<i>Poa pratensis</i>	9.0	5.8	7.4

Shrub Layer			
Density = 36 stems/100 m <sup>2</sup>			
	RF	RD	IV
<i>Rhamnus cathartica</i>	59.9	44.4	52.1
<i>Cornus racemosa</i>	40.1	55.6	47.9

**Table 3. Cattail Marsh:** n=4 13.2 acres

Herb Layer			
	RF	RD	IV
<i>Typha angustifolia</i>	33.3	52.7	43.0
<i>Lemna minor</i>	22.2	18.4	20.3
<i>Typha latifolia</i>	11.1	21.6	16.4
<i>Lythrum salicaria</i>	11.1	4.1	7.6

**Table 4. Sedge Meadow: Relative Frequency (RF), Relative Dominance (RDM), Relative Density (RD) and Importance Value (IV) n=9 12.5 acres**

Herb Layer			
	RF	RDM	IV
<i>Carex stricta</i>	20.2	49.9	35.1
<i>Calamagrostis canadensis</i>	11.4	12.0	11.7
<i>Phalaris arundinacea</i>	5.7	6.6	6.2
<i>Helianthus grosseserratus</i>	8.5	3.3	5.9
<i>Juncus dudleyi</i>	2.8	7.0	4.9

Shrub Layer			
Density = 17 stems/100 m <sup>2</sup>			
	RF	RD	IV
<i>Cornus racemosa</i>	28.6	73.2	50.9
<i>Rhamnus cathartica</i>	28.6	17.1	22.8
<i>Viburnum lentago</i>	14.3	4.9	9.6

**Table 5. Shrubland/Forbland n=31 112.9 acres**

Herb Layer			
	RF	RD	IV
<i>Cornus racemosa</i>	12.6	14.1	13.4
<i>Rhamnus cathartica</i>	7.6	14.4	11.0
<i>Solidago rigida</i>	8.7	7.9	8.3
<i>Fragaria virginiana</i>	8.2	5.7	7.0
<i>Poa pratensis</i>	6.8	6.8	6.8
<i>Solidago canadensis</i>	6.8	6.1	6.4
<i>Poa compressa</i>	3.1	6.5	4.8

Shrub Layer			
Density = 99 stems/100 m <sup>2</sup>			
	RF	RD	IV
<i>Cornus racemosa</i>	27.2	57.4	42.3
<i>Rhamnus cathartica</i>	31.4	28.7	30.1
<i>Crateagus flabellata</i>	9.4	3.7	6.6
<i>Lonicera tartarica</i>	9.4	3.3	6.4
<i>Crateagus mollis</i>	7.4	2.0	4.7

**Table 6. Pin Oak Woodland: 1.9 acres**

Herb Layer - *Rhamnus cathartica*

Sapling Layer - *Rhamnus cathartica*, *Prunus serotina*, *Quercus macrocarpa*

Overstory - *Quercus palustris*, *Prunus serotina*, *Populus deltoides*, *Quercus macrocarpa*

## Discussion

The North Chicago site has great potential for prairie restoration and wetland protection. The site's large size (62.3 ha (154 acres)) and interspersed uplands, wetlands and transition areas provides conditions favorable for plant and animal diversity. Even though crop production, grazing and hay mowing have had negative effects, the area still retains some native character. The sedge meadows are relatively undisturbed and diverse and contain at least one species threatened in Illinois. The marshes, although not of high quality, provide open water and good cover for wildlife. The uplands have excellent conditions for prairie restoration: Several patches of good quality prairie are present and they contain conservative species and at least one species endangered in Illinois. The nonnative grasslands still contain prairie species and a few prairie species still persist under the densest buckthorn thickets. Clearing shrub thickets, followed by herbicide application and establishing a fire regime should produce dramatic results: the establishment of a high quality prairie-sedge meadow-marsh complex with a diverse assemblage of native plants and potential for threatened and endangered species. The area's large size and habitat diversity provide excellent conditions for prairie and wetland wildlife. Habitat restoration activities at a site with such high potential should provide considerable mitigation banking credit.

Since a major part of the value of the southern 60% of this site lies in its interspersed prairie uplands, wetlands and transition areas, and since good quality sedge meadows could easily be degraded by attempts to increase their size, construction of wetlands in this area should not be attempted. The northern 40% of the site has been greatly altered by crop production. Therefore, wetland creation/restoration activities should be concentrated here. The western third of the northern quarter contains poorly drained Montgomery soil and somewhat poorly drained Frankfort soil. Although very disturbed, this area contains one small sedge meadow and several small degraded wetlands dominated by *Typha* and *Phalaris*. Water enters this area from the west and north and one or two small, shallow depressions totaling about 2.0 ha (5 acres) could be created utilizing this water source. Credit for the creation of several small wetlands in the northwestern corner of the site could be added to the substantial credit obtained through restoration and preservation of the outstanding natural system existing on the southern two thirds of the property.

## Literature Cited

- Fucciolo, C. and M. Miller. 1995. Initial site evaluation: IL Rt. 137 potential wetland compensation site, North Chicago, Lake Co. Illinois. IDOT Technical Report, Illinois Geological Survey, Champaign, IL. 21 p.
- Herbert, J. ed. 1991. Endangered and threatened species of Illinois: status and distribution, Volume 1-Plants. Illinois Endangered Species Protection Board, Springfield, IL. 158 p.
- \_\_\_\_\_. 1992. Endangered and threatened species of Illinois: status and distribution, Volume 2-Animals. Illinois Endangered Species Protection Board, Springfield, IL. 142 p.
- Mohlenbrock, R. 1986. Guide to the vascular flora of Illinois. Southern Illinois University Press, Carbondale, IL. 507 p.
- Pashke, J. and J. Alexander. 1970. Soil survey of Lake Co., Illinois. USDA, Soil Conservation Service, no. 88, Washington, D.C. 82 p.
- Swink, F. and G. Wilhelm. 1979. Plants of the Chicago region. Morton Arboretum, Lisle, IL, 922 p.
- Taft, J., D. Ladd, G. Wilhelm and L. Wetstein. 1993. Floristic quality assessment database for the state of Illinois. Unpublished report. 39 p.

**Appendix Table 1. Plant species list for wet meadow (community type A)**

Scientific name	Common name	Stratum	Wetland indicator status	FQI*
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Bidens frondosa</i>	beggar's ticks	herb	FACW	1
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	
<i>Cornus racemosa</i>	gray dogwood	shrub	FACW-	1
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	
<i>Fragaria virginiana</i>	wild strawberry	herb	FAC-	2
<i>Helianthus grosseserratus</i>	sawtooth sunflower	herb	FACW-	2
<i>Ipomea hederacea</i>	ivy leaf morning glory	herb	FAC	
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	
<i>Poa pratensis</i>	Kentucky blue grass	herb	FAC-	
<i>Ranunculus cymbalaria</i>	seaside crowfoot	herb	OBL	2
<i>Rhamnus cathartica</i>	buckthorn	shrub	FACU	
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1

\*Floristic Quality Index, by J. Taft, D. Ladd, G. Wilhelm and L. Wetstein (1993)

FQI= 4.6, mean C = 1.6

**Appendix Table 2. Plant species list for forbland/prairie  
(community type B)**

Scientific name	Common name	Stratum	Wetland indicator status	FQI*
<i>Achillea millefolium</i>	yarrow	herb	FACU	
<i>Andropogon gerardii</i>	big bluestem	herb	FAC-	5
<i>Antennaria plantaginifolia</i>	pussy toes	herb	UPL	4
<i>Aster praealtus</i>	Willow leaf aster	herb	FACW	4
<i>Aster sp.</i>	aster	herb		
<i>Bromus ciliatus</i>	Canada brome	herb	FACW	10
<i>Carex sp.</i>	sedge	herb		
<i>Comandra umbellata</i>	bastard toadflax	herb	FACU	6
<i>Cornus racemosa</i>	gray dogwood	shrub	FACW-	1
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	
<i>Equisetum arvense</i>	common horsetail	herb	FAC	0
<i>Eryngium yuccifolium</i>	rattlesnake master	herb	FAC+	8
<i>Festuca pratensis</i>	English bluegrass	herb	FACU-	
<i>Fragaria virginiana</i>	wild strawberry	herb	FAC-	2
<i>Helianthus grosseserratus</i>	sawtooth sunflower	herb	FACW-	2
<i>Hypericum perforatum</i>	common St. Johns wort	herb	UPL	
<i>Leucanthemum vulgare</i>	tansy	herb	UPL	
<i>Liatris aspera</i>	rough blazing star	herb	UPL	7
<i>Liatris pynostachya</i>	gayfeather	herb	FAC-	6
<i>Lobelia spicata</i>	spiked lobelia	herb	FAC	5
<i>Melilotus alba</i>	white sweet clover	herb	FACU	
<i>Monarda fistulosa</i>	wild bergamot	herb	FACU	4
<i>Oenothera perennis</i>	small sundrops	herb	FAC	8
<i>Phlox glaberrima</i>	smooth phlox	herb	FACW	6
<i>Poa compressa</i>	Canadian bluegrass	herb	FACU+	
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	
<i>Potentilla recta</i>	sulfur cinquefoil	tree	UPL	
<i>Potentilla simplex</i>	common cinquefoil	herb	FACU-	3
<i>Prunella vulgaris</i>	self heal	herb	FAC	
<i>Ratibida pinnata</i>	drooping coneflower	herb	UPL	4
<i>Rhamnus cathartica</i>	buckthorn	shrub	FACU	
<i>Schizachyrium scoparium</i>	little bluestem	herb	FACU-	5
<i>Silphium terabinthaceum</i>	prairie dock	herb	FAC-	5
<i>Sisyrinchium albidum</i>	blue eyed grass	herb	FACU	4
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	giant goldenrod	herb	FACW	3
<i>Solidago rigida</i>	stiff goldenrod	shrub	FACU-	4
<i>Sorghastrum nutans</i>	Indian grass	herb	FACU+	4
<i>Spartina pectinata</i>	prairie cord grass	herb	FACW+	4
<i>Vicia americana</i>	American vetch	herb	NI	7
<i>Zizia aurea</i>	golden Alexanders	herb	FAC+	6

\*Floristic Quality Index, by J. Taft, D. Ladd, G. Wilhelm and L. Wetstein (1993)

FQI= 24.2, mean C = 4.6

**Appendix Table 3. Plant species list for sedge meadow  
(community type C)**

Scientific name	Common name	Stratum	Wetland indicator status	FQI*
<i>Allium canadense</i>	wild garlic	herb	FACU	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Aster praealtus</i>	willow leaf aster	herb	FACW	4
<i>Bidens frondosa</i>	beggar's ticks	herb	FACW	1
<i>Calamagrostis canadensis</i>	blue joint grass	herb	OBL	3
<i>Carex stricta</i>	tussock sedge	herb	OBL	5
<i>Carex sp.</i>	sedge	herb		
<i>Cornus racemosa</i>	gray dogwood	shrub	FACW-	1
<i>Cicuta maculata</i>	water hemlock	herb	OBL	4
<i>Crateagus mollis</i>	downy hawthorn	shrub	FACW-	2
<i>Eleocharis sp.</i>	spike rush	herb		
<i>Equisetum arvense</i>	common horsetail	herb	FAC	0
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Fragaria virginiana</i>	wild strawberry	herb	FAC-	2
<i>Geum laciniatum</i>	rough avens	herb	FACW	2
<i>Glyceria striata</i>	fowl manna grass	herb	OBL	4
<i>Helianthus grosseserratus</i>	sawtooth sunflower	herb	FACW-	2
<i>Hypoxis hirsuta</i>	yellow stargrass	herb	FAC	6
<i>Iris shreveii</i>	southern blueflag	herb	OBL	5
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Liatris spicata</i>	spiked gayfeather	herb	FAC	7
<i>Lonicera tatarica</i>	Tartarian honeysuckle	shrub	FACU	
<i>Lycopus americanus</i>	water horehound	herb	OBL	3
<i>Lycopus virginicus</i>	bugleweed	herb	OBL	5
<i>Penstemon digitalis</i>	foxglove beardtongue	herb	FAC-	4
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	
<i>Potentilla simplex</i>	common cinquefoil	herb	FACU-	3
<i>Pycnanthemum virginianum</i>	common mountain mint	herb	FACW+	5
<i>Rhamnus cathartica</i>	buckthorn	shrub	FACU	
<i>Rosa caroliniana</i>	Carolina rose	shrub/herb	FACU-	4
<i>Scirpus pendulus</i>	red bulrush	herb	OBL	3
<i>Senecio vulgaris</i>	groundsel	herb	UPL	
<i>Sium suave</i>	water parsnip	herb	OBL	5
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	giant goldenrod	herb	FACW	3
<i>Spartina pectinata</i>	prairie cordgrass	herb	FACW+	4
<i>Spiranthes cernua</i>	nodding ladies' tresses	herb	FACW-	4
<i>Typha angustifolia</i>	narrowleaf cattail	herb	OBL	
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Veronica scutellata</i>	marsh speedwell	herb	OBL	10
<i>Viburnum lentago</i>	nannyberry	shrub	FAC+	4

\*Floristic Quality Index, by J. Taft, D. Ladd, G. Wilhelm and L. Wetstein (1993)

FQI= 21.0, mean C = 3.5

Appendix Table 4. Plant species list for shrubland/forbland  
(community type D)

Scientific name	Common name	Stratum	Wetland indicator status	FQI*
<i>Agrimonia gryposepala</i>	tall agrimony	herb	FACU+	2
<i>Allium canadense</i>	wild garlic	herb	FACU	2
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Andropogon gerardii</i>	big bluestem	herb	FAC-	5
<i>Anemone cylindrica</i>	candle anemone	herb	UPL	8
<i>Antennaria plantaginifolia</i>	pussy toes	herb	UPL	4
<i>Aster nova anglica</i>	New England aster	herb	FACW	4
<i>Aster praealtus</i>	willow leaf aster	herb	FACW	4
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Aster sp.</i>	aster	herb		
<i>Barbarea vulgaris</i>	winter cress	herb	FAC	
<i>Carex cristatella</i>	crested sedge	herb	FACW+	3
<i>Carex stricta</i>	tussock sedge	herb	OBL	5
<i>Carex sp.</i>	sedge	herb		
<i>Circaea lutetiana</i>	enchanter's nightshade	herb	FACU	
<i>Cornus racemosa</i>	gray dogwood	shrub	FACW-	1
<i>Crateagus flabellata</i>	hawthorn	sapling/shrub	UPL	5
<i>Crateagus mollis</i>	downy hawthorn	sapling/shrub	FACW-	2
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	
<i>Dicanthelium acuminatum</i>	panic grass	herb	FAC	1
<i>Equisetum arvense</i>	common horsetail	herb	FAC	0
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Erigeron strigosus</i>	daisy fleabane	herb	FAC-	2
<i>Euthamia graminifolia</i>	grass leaf goldenrod	herb	FACW-	3
<i>Fragaria virginiana</i>	wild strawberry	herb	FAC-	2
<i>Galium aparine</i>	annual bedstraw	herb	FACU	0
<i>Gentiana puberulenta</i>	downy gentian	herb	FACU	9
<i>Geum aleppicum</i>	yellow avens	herb	FAC+	6
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Geum laciniatum</i>	rough avens	herb	FACW	2
<i>Helianthus grosseserratus</i>	sawtooth sunflower	herb	FACW-	2
<i>Hieracium sp.</i>	hawkweed	herb		
<i>Hypericum perforatum</i>	common St. John's wort	herb	UPL	
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Lactuca canadensis</i>	Canada lettuce	herb	FACU+	1
<i>Leucanthemum vulgare</i>	tansy	herb	UPL	
<i>Liatris aspera</i>	rough blazing star	herb	UPL	7
<i>Liatris spicata</i>	spiked gayfeather	herb	FAC	7
<i>Lobelia spicata</i>	spiked lobelia	herb	FAC	5
<i>Lonicera tatarica</i>	Tartarian honeysuckle	shrub	FACU	
<i>Melilotus alba</i>	white sweet clover	herb	FACU	
<i>Monarda fistulosa</i>	wild bergamot	herb	FACU	4

\*Floristic Quality Index, as developed by J. Taft, D. Ladd, G. Wilhelm and L. Wetstein (1993)

(continued on next page)

**Appendix Table 4 (cont.) Plant species list for shrubland/forbland  
(community type D)**

Scientific name	Common name	Stratum	Wetland indicator status	FQI*
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0
<i>Parthenium integrifolium</i>	American feverfew	herb	UPL	7
<i>Plantago rugelii</i>	Rugel's plantain	herb	FAC	0
<i>Poa compressa</i>	Canadian bluegrass	herb	FACU+	
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	
<i>Potentilla recta</i>	sulfur cinquefoil	herb	UPL	
<i>Potentilla simplex</i>	common cinquefoil	herb	FACU-	3
<i>Prunella vulgare</i>	self heal	herb	FAC	
<i>Prunus americana</i>	American plum	shrub	UPL	3
<i>Prunus serotina</i>	black cherry	tree/sapling	FACU	1
<i>Prunus virginiana</i>	choke cherry	sapling/shrub	FAC-	3
<i>Pycnanthemum virginianum</i>	common mountain mint	herb	FACW+	5
<i>Ratibida pinnata</i>	drooping coneflower	herb	UPL	4
<i>Rhamnus cathartica</i>	buckthorn	sapling/shrub	FACU	
<i>Rhamnus frangula</i>	glossy buckthorn	sapling/shrub	FAC+	
<i>Rhus glabra</i>	smooth sumac	shrub	UPL	1
<i>Rosa carolina</i>	Carolina rose	shrub/herb	FACU-	4
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	
<i>Rubus occidentalis</i>	black raspberry	shrub	UPL	2
<i>Rudbeckia hirta</i>	black eyed Susan	herb	FACU	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	
<i>Sanicula gregaria</i>	common snakeroot	herb	FAC+	2
<i>Senecio vulgaris</i>	groundsel	herb	UPL	
<i>Silphium terebinthinaceum</i>	prairie dock	herb	FAC-	5
<i>Sisyrinchium albidum</i>	blue eyed grass	herb	FACU	4
<i>Smilax hispida</i>	bristly greenbriar	woody vine	FAC	3
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	giant goldenrod	herb	FACW	3
<i>Solidago rigida</i>	stiff goldenrod	herb	FACU-	4
<i>Spartina pectinata</i>	prairie cordgrass	herb	FACW+	4
<i>Stellaria media</i>	common chickweed	herb	FACU	
<i>Taraxacum officinale</i>	common dandelion	herb	FACU	
<i>Ulmus rubra</i>	slippery elm	tree/sapling	FAC	3
<i>Viburnum lentago</i>	nannyberry	shrub	FAC+	4
<i>Viola pedatifida</i>	prairie violet	herb	FACU-	10
<i>Viola pratensis</i>	common blue violet	herb	FAC	1
<i>Viola sororia</i>	wooly blue violet	herb	FAC-	3
<i>Vitis riparia</i>	riverbank grape	woody vine	FACW-	3

\*Floristic Quality Index, as developed by J. Taft, D. Ladd, G. Wilhelm and L. Wetstein (1993)

FQI= 25.0, mean C= 3.2

Appendix Table 5. Plant species list for marsh (community type E)

Scientific name	Common name	Stratum	Wetland indicator status	FQI*
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Calamagrostis canadensis</i>	blue joint grass	herb	OBL	3
<i>Carex sp.</i>	sedge	herb		
<i>Cicuta maculata</i>	water hemlock	herb	OBL	4
<i>Equisetum arvense</i>	common horsetail	herb	FAC	0
<i>Helianthus grosseserratus</i>	sawtooth sunflower	herb	FACW-	2
<i>Iris shreveii</i>	southern blue flag	herb	OBL	5
<i>Lemna minor</i>	duckweed	herb	OBL	3
<i>Lycopus virginicus</i>	bugleweed	herb	OBL	5
<i>Lythrum salicaria</i>	purple loosestrife	herb	OBL	
<i>Phragmites communis</i>	common reed	herb	FACW+	1
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Proserpinaca palustris</i>	mermaid weed	herb	OBL	5
<i>Ranunculus flabellaris</i>	yellow water buttercup	herb	OBL	6
<i>Scirpus fluviatilis</i>	river bulrush	herb	OBL	3
<i>Scirpus validus</i>	soft stem bulrush	herb	OBL	4
<i>Solanum dulcamara</i>	false bittersweet	herb	FAC	
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Typha angustifolia</i>	narrow leaf cattail	herb	OBL	
<i>Typha latifolia</i>	common cattail	herb	OBL	1
<i>Viola pratincola</i>	common blue violet	herb	FAC	1

\*Floristic Quality Index, as developed by J. Taft, D. Ladd, G. Wilhelm and L. Wetstein (1993)

FQI= 12.1, mean C = 2.9

**Appendix Table 6. Plant species list for woodlands  
(community types F,G,H)**

Scientific name	Common name	Stratum	Wetland indicator status	FQI*
<i>Crateagus flabellata</i>	hawthorn	sapling/shrub	UPL	5
<i>Crateagus mollis</i>	downy hawthorn	sapling/shrub	*FACW-	2
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Lonicera tatarica</i>	Tartarian honeysuckle	shrub	FACU	
<i>Parthenocissus quinquefolia</i>	Virginia creeper	woody vine	FAC-	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	
<i>Populus deltoides</i>	eastern cottonwood	tree/sapling	FAC+	2
<i>Prunus serotina</i>	black cherry	tree/sapling	FACU	1
<i>Prunus virginiana</i>	choke cherry	sapling/shrub	FAC-	3
<i>Quercus macrocarpa</i>	bur oak	tree/sapling	FAC-	5
<i>Quercus palustris</i>	pin oak	tree/sapling	FACW	4
<i>Rhamnus cathartica</i>	buckthorn	sapling/shrub	FACU	
<i>Rhamnus frangula</i>	glossy buckthorn	sapling/shrub	FAC+	
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	tree/sapling	OBL	3
<i>Sanicula gregaria</i>	common snakeroot	herb	FAC+	2
<i>Smilax hispida</i>	bristly greenbriar	woody vine	FAC	3
<i>Toxicodendron radicans</i>	poison ivy	woody vine	FAC+	1
<i>Ulmus rubra</i>	slippery elm	tree/sapling	FAC	3
<i>Viola pratincola</i>	common blue violet	herb	FAC	1
<i>Vitis riparia</i>	riverbank grape	woody vine	FACW-	3

\*Floristic Quality Index, as developed by J. Taft, D. Ladd, G. Wilhelm and L. Wetstein (1993)